Morphological examination of intrahepatic bile ducts in hepatolithiasis

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Summary. Numerous glandular elements are characteristically found within and around the intrahepatic bile duct walls in hepatolithiasis. These glandular elements were studied by reconstruction of serial sections and mucus histochemistry. The glands were of two types: glands within the thickened ductal wall (intramural) and those outside the wall (extramural). The former were mucous glands arranged in tubular pattern and the latter seromucous glands arranged in tubuloalveolar pattern. Mucous acini of both glands were rich in neutral, carboxylated and sulfated mucus glycoproteins. Serial section observations showed that the intramural glands communicated with bile duct lumina directly, and the extramural glands with ductal lumina via their own conduits. The intramural glands were usually continuous with the epithelia lining bile ducts, suggesting that they were derived from an invagination and subsequently proliferating epithelium lining bile ducts. The extramural glands may have arisen from a proliferation of the pre-existing peribiliary glands. Hypersecreted mucus from the intramural and extramural glands might be causally related to the development and growth of calculi in the intrahepatic biliary tree.

Key words: Hepatolithiasis – Intrahepatic Peribiliary Glands – Mucus

Introduction

One of the characteristic pathological features in hepatolithiasis, prevalent in the Far East, is a presence of considerable amounts of glandular tissues around stone-containing bile ducts (Nakanuma et al. 1981; Yamamoto 1982; Ohta et al. 1984). These glands are known to secrete much mucus into the ductal lumen and Yamamoto divided them into intra- and extramural; the former were within the thickened duct wall and the latter outside it (Yamamoto 1982). The morphogenesis of these glandular tissues and their pathological significance in calculi formation are, however, still speculative. Some Japanese surgeons have insisted that these glands in hepatolithiasis are anomalous ectopic tissue, although there has been no objective evidence. Furthermore, the relationship between these glands in hepatolithiasis and the peribiliary glands which are present physiologically in normal livers (Terada et al. 1987) remains unclear.

The aims of the present paper are to describe the detailed morphology of these glands in hepatolithiasis and to know the origin of these glandular tissues with a help of serial sections. Mucus histochemistry of the glandular tissue was also examined.

Materials and methods

A total of 18 livers with hepatolithiasis (8 autopsy and 10 surgically-resected liver specimens), were used. Age of the patients ranged from 22 to 91 years (62 year mean). The male to female ratio was 10:8. Percutaneous transhepatic cholangiography and/or endoscopic retrograde cholangiography were carried out in the 10 surgical cases. In the 8 autopsy cases, the identification of the stone-bearing bile ducts was made macroscopically, and two autopsy cases were subjected to postmortem cholangiography to determine the exact location of the calculi (Fig. 1). Many tissue blocks containing stone-bearing bile ducts were obtained with reference to the cholangiogram in each case, and were fixed in 10% neutral formalin and embedded in paraffin. Gall stones, which were embedded in paraffin together with bile ducts, could be cut off relatively easily by an ordinary microtome. Ten serial sections (5 μm in thickness) from each block were stained with the following procedures: haematoxylin and eosin, periodic acid-Schiff with or without prior diastase digestion, Alcian blue at pH 1.0 and 2.5, colloidal iron, combined Alcian blue at pH 2.5 and periodic acid-Schiff (Mowry 1963),
Fig. 1. Postmortem intrahepatic cholangiogram of a liver with hepatolithiasis viewed from postero-anterior direction. Intrahepatic calculi are seen as radiolucent materials within the dilated intrahepatic bile ducts of both lobes. CHD; common hepatic duct; reduced to seven tenths.

Fig. 2. A Postmortem intrahepatic cholangiogram of a normal liver of 43-year-old man who died of pulmonary embolism. The cholangiogram is postero-anterior direction; reduced to two thirds. B Trace of the A. Closed, hatched and dotted compartments were area, segmental and hepatic ducts, respectively; CHD, common hepatic duct.